



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,798	03/10/2004	Thomas L. Mydlack	B03-75	4504
40990	7590	03/15/2006	EXAMINER	
ACUSHNET COMPANY 333 BRIDGE STREET P. O. BOX 965 FAIRHAVEN, MA 02719			NGUYEN, SANG H	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 03/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/797,798

Applicant(s)

MYDLACK ET AL.

Examiner

Sang Nguyen

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 22-25 is/are rejected.
- 7) ☒ Claim(s) 21 and 26-33 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 03/10/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant's response to elected Group I (claims 1-28) without traverse filed on 02/06/06 is acknowledge. And Applicant's response to amendment filed on 02/06/06 has been entered. It is noted that the application contains claims 1-33 by the amendment on 2/6/06.

### ***Oath/Declaration***

The oath/declaration filed on 03/10/04 is acceptable.

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 03/10/04 has been entered. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Rejections - 35 USC § 102***

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

**Claims 1-2 and 22-23 are rejected under 35 U.S.C. 102(a) as being anticipated by Welchman et al (U.S. Patent No. 6,630,998 submitted by applicant).**

**Regarding claims 1-2;** Welchman et al discloses a method of inspecting a curved object is a contour surface of a golf ball (66 of figure 2 and col.3 lines 46-51), comprising:

acquiring an inspection image of a curved object (66 of figure 4 and col.7 lines 22-27) by an imaging system (30' of figure 4) having a detecting apparatus considered to be a detector or camera (36' of figure 4);

comparing the adjusted image with a predetermined master image considered to be a reference image (col.4 lines 20-36; col. 8 lines 35-40; and col.13 lines 52-67) by analyzer (32' of figure 4) having a vision engine (42a' of figure 4) and a monitor (44' of figure 4).

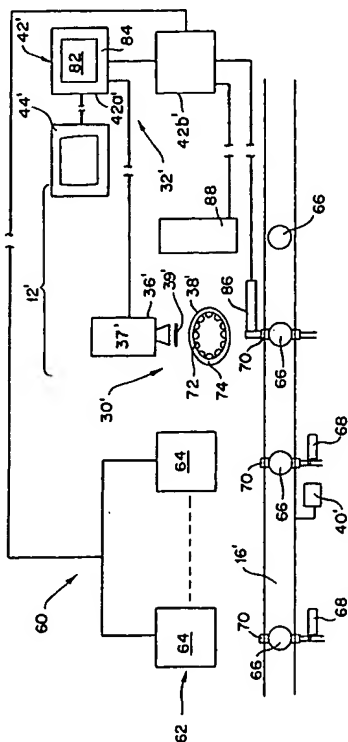


Fig. 4

**Regarding claims 22-23;** Welchman et al discloses the inspection image is a two-dimensional image of three-dimensional image by adjusting image (col.4 lines 1-14)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 3-4, 12-14,19, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Welchman et al (U.S. Patent No. 6,630,998 submitted by applicant) in view of Wang et al (U.S. Patent No. 6,594,623).**

**Regarding claims 3-4 and 24;** Welchman et al discloses all of feature of claimed invention except for the detector is a line scan camera that scans the object at a scan line that defines a plane, wherein the object is illuminated with light directed along a plane or a conical section while acquiring the inspection data. However, Wang et al teaches that it is known in the art to provide the detector 14 of figure 1) is a line scan camera (col.1 lines 65-67) that scans the object at a scan line that defines a plane (figures 8-11), wherein the object 12 of figure 1) is illuminated with light directed by a light source (13 of figure 1) along a plane or a conical section (figures 10-11) while acquiring the inspection data by an imaging processing system (16 of figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method of Welchman et al with the detector is a line scan camera that

scans the object at a scan line that defines a plane, the object is illuminated with light directed along a plane or a conical section while acquiring the inspection data as taught by Wang et al for the purpose of determining the orientation and equator of the game ball.

**Regarding claim 12;** Welchman et al discloses the light is polarized according to an illuminating axis of polarization (39' of figure 4) and a lens (considered in figure 4 is between camera [36' of figure 4] and a polarizer filter [39' of figure 4]) for the camera (36' of figure 4) is polarized according to a detecting axis of polarization figure 4), wherein the illuminating and detecting axes are configured with respect to one another to reduce glare (col.12 lines 35-47).

**Regarding claim 13;** Welchman et al discloses the illuminating axis of the light source (38 of figure 2) and detecting axis of the camera (36' of figure 2) are positioned at about angle to object (figures 2, 4, and 6). However, Welchman et al discloses all of feature of claimed invention except for discloses the illuminating and detecting axes are positioned at about 90-degree angle to one another. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method of Welchman et al the illuminating and detecting axes are positioned at about 90-degree angle to one another, since it has been that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

**Regarding claim 14;** Welchman et al discloses a diffuse, on-axis light source provides supplemental light (col.12 lines 30-34 and 56-60, and col.13 lines 5-15).

**Regarding claim 19;** Welchman et al discloses the light is directed through polarizer filter (39 of figure 2) having varying angles of polarized on with respect to each other (figures 2 and 4).

**Claims 5-6, 11, 15-16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Welchman et al in view of Wang et al as applied to claim 1-4 above, and further in view of Yoshimura et al (U.S. Patent No. 6,061,126).**

**Regarding claims 5-6 and 11;** Welchman et al in view of Wang et al discloses all of feature of claimed invention except for the object is illuminated with light directed parallel to the plane while acquiring the inspection data, wherein the light is in a line and the line conforms to a curved surface of the object. Yoshimura et al teaches that it is known in the art to provide the object (1 of figure 2) is illuminated with light directed parallel (figure 2) by the light source (21a of figure 2) to the plane while acquiring the inspection data by a computation determination section (23 of figure 2), wherein the light is in a line and the line conforms to a curved surface of the object (1 of figures 23-27). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method of Welchman et al with the object is illuminated with light directed parallel to the plane while acquiring the inspection data, wherein the light is in a line and the line conforms to a curved surface of the object as taught by Yohimura et al for the purpose of improving the speed and accuracy of detecting the surface of inspected object.

**Regarding claims 15-16 and 20;** Welchman et al in view of Wang et al discloses all of feature of claimed invention except for a mirror is used to reflect light towards the scan line and the step of adjusting the light to account for non-uniform object illumination at the scan line. Yoshimura et al teaches that it is known in the art to provide a mirror(41, 42 of figure 15) is used to reflect light towards the scan line of the object (1 of figure 15) and the step of adjusting the light to account for non-uniform object illumination at the scan line of the object (1 of figure 23) by image processing section (22a, 22b of figure 23) coupled to computation determination (23 of figure 23). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method of Welchman et al with a mirror is used to reflect light towards the scan line and the step of adjusting the light to account for non-uniform object illumination at the scan line as taught by Yoshimura et al for the purpose of improving the speed and accuracy of detecting the surface of inspected object.

**Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Welchman et al in view of Wang et al as applied to claims 1-4 above, and further in view of Hallerman et al (U.S. Patent No. 6,262,803).**

**Regarding claim 17;** Welchman et al in view of Wang et al discloses all of feature of claimed invention except for the light is directed through an aperture having varying widths along the line. However, Hallerman et al teaches that it is known in the art to provide the light from light source (30 of figure 2) is directed through an aperture (61 of figures 2 and 8) having varying widths along the line (col.7 lines 15-28). It would have been obvious to one having ordinary skill in the art at the time the invention was



made to combine method of Welchman et al with the light is directed through an aperture having varying widths along the line as taught by Hallerman et al for the purpose of improving the speed and accuracy of detecting the surface of narrowing rectangular slit in the same direction as in the lines in the projected light pattern.

**Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Welchman et al in view of Wang et al as applied to claims 1-4 above, and further in view of Yoshida (U.S. Patent No. 4,555,635).**

**Regarding claim 18;** Welchman et al in view of Wang et al discloses all of feature of claimed invention except for the light is directed though a comb-like structure having members with varying pitch. However, Yoshida teaches that it is known in the art to provide the light is directed though a comb-like structure (5 of figure 3) having members with varying pitch. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method of Welchman et al with the light is directed though a comb-like structure having members with varying pitch as taught by Yoshida for the purpose of improving the speed and accuracy of detecting the surface of inspecting flaws on the inspected surface can be conducted effectively.

**Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Welchman et al in view of Wang et al as applied to claims 1-6 above, and further in view of Kimura (U.S. Patent No. 4,987,499).**

**Regarding claims 7-9;** Welchman et al in view of Wang et al and further in view of Yoshimura et al discloses all of feature of claimed invention except for the line comprises a linear array of fiber optic bundles that direct the light from at least one light

source. However, Kimura teaches that it is known in the art to provide a linear array (42 of figure 1) of fiber optic bundles (32 of figure 1) that direct the light from at least one light source (30 of figure 1), wherein the bundles (32 of figure 1) define a gap through which the scan line is directed (figure 1) and the at least one light source comprises a high intensity discharge light (figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method of Welchman et al with a linear array of fiber optic bundles that direct the light from at least one light source, wherein the bundles define a gap through which the scan line is directed and the at least one light source comprises a high intensity discharge light as taught by Kimura for the purpose of accuracy of detecting the surface image in main scanning direction by illumination.

**Regarding claim 10;** Welchman et al in view of Wang et al and further in view of Yoshimura et al discloses all of feature of claimed invention except for the line directs the light through at least one lens to provide more uniform illumination along the scan line. However, Kimura teaches that it is known in the art to provide the line directs the light through at least one lens (36, 34 of figure 1) to provide more uniform illumination along the scan line (figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method of Welchman et al with the line directs the light through at least one lens to provide more uniform illumination along the scan line as taught by Kimura for the purpose of reducing noise from the light source.

**Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida (U.S. Patent No. 4,246,606) in view of Bradski et al (U.S. Patent No. 6,768,509)**

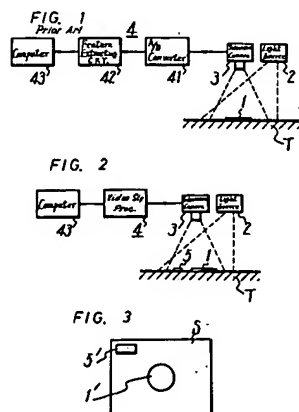
**Regarding claim 25;** Yoshida discloses a method for inspecting a curved object (1 of figure 1) comprising the steps of:

acquiring an image of a white calibration object (5' of figure 3) as a predetermined master image (5' of figure 3);

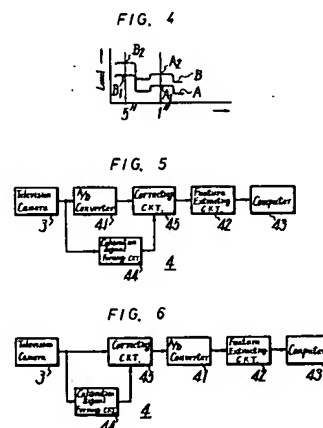
acquiring an inspection image of a curved object (1, 5 of figure 2) by a detector considered to be a camera (3 of figure 2); and

adjusting the inspection image to adjust the brightness to account for non-uniform illumination (col.3 line 55 to col.4 line 14) by a video signal processing circuit (4 of figure 2) coupled to a computer (43 of figure 2). See figures 1-10.

U.S. Patent Jun. 20, 1981 Sheet 1 of 5 4,246,606



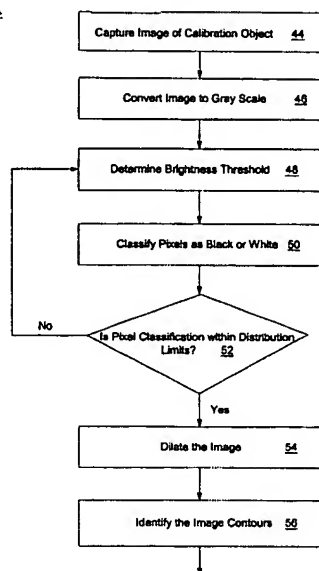
U.S. Patent Jun. 20, 1981 Sheet 2 of 5 4,246,606



Yoshida discloses all of features of claimed invention except for white calibration object. However, Bradski et al teaches that it is known in the art to provide white calibration object (col.7 lines 25-30 and figures 1-3).

U.S. Patent Jul. 27, 2004 Sheet 3 of 8 US 6,768,509 B1

Fig. 3A



U.S. Patent Jul. 27, 2004 Sheet 1 of 8 US 6,768,509 B1

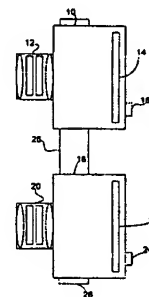


Fig. 1

Therefore, It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method of Yoshida with white calibration object as taught by Bradski et al for the purpose of determining accuracy of locations of points of interest on an image of a calibration object by a calibration camera.

### ***Allowable Subject Matter***

Claims 21, and 26-33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method for inspecting a curved object comprising all the specific elements with the specific combination including of the step of adjusting the brightness comprises the steps of measuring brightness values for each pixel in the master image; calculating a reference brightness value; establishing scale factors for each pixel in the master image based on the reference brightness value; and adjusting corresponding pixel brightness values in the inspection image by applying the scale factors in set forth limitation of claims 21 and 26.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method for inspecting a curved object comprising all the specific elements with the specific combination including of adjusting the inspection image's comprises the steps of applying the formula  $V = M \times (VC)$ , where M is the maximum gray value for a fixed pixel, I is the gray value for a particular pixel in the inspection image and C is the value for that same pixel obtained during calibration in set forth limitation of claim 27.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method for inspecting a curved object comprising all the specific elements with the specific combination including of the inspection image to minimize curvature distortion comprises the steps of: adjusting at least one pixel in the inspection image in one direction using the formula:  $X_{adj} = R \cdot \arcsine (X_i/R)$ ; and adjusting said pixel in the other direction using the formula:  $Y_{adj} = C - ((C - Y_i) / \cos \Theta)$ , where R is the radius of the curved object,  $(X_i, Y_i)$  are the coordinates of said pixel, C is a reference point on the inspection image,  $\Theta$  is the angular location above or below the equator of the curved

object, and (Xadj, Yadjl are the coordinates of the adjusted pixel in set forth limitation of claim 29.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wagman (6798925) discloses method and apparatus for calibration an image acquisition system; Bachelder et al (6798515) discloses method for calculating a scale relationship for an imaging system; Shimosaka et al (discloses method and apparatus for measuring the surface shape of a golf ball; or Manning (5467192) discloses improvement in or relating to surface curvature measurement..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

Art Unit: 2877

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 1, 2006

SN

  
**Patent Examiner**  
**Sang Nguyen**  
**Art Unit 2877**